REMARKS

The Office Action rejected claims 1, 2, 6, 7, 13, 15, 16, 21, 23 and 24 under 35 U.S.C. § 103(a) as being obvious from Pal et al. (U.S. Patent No. 4,760,478, hereinafter Pal) in view of Oberg (U.S. Patent No. 4,991,045).

Pal discloses a suspension assembly that includes a 3 mils thick stainless steel load beam 24. To reduce vibrations on the suspension assembly, Pal applies a 5 mils thick viscoelastic material to steel load beam 24. This material has adhesive on both sides of it and thus is adhesively applied to load beam 24. A 2 mils thick steel constraining member 36 is then applied to the viscoelastic material. Note that Pal does not adhesively apply the constraining member 36 to load beam 24 but instead adhesively applies constraining member 36 to the viscoelastic dampening material, which is actually thicker than the load beam.

Oberg discloses a suspension assembly that utilizes plastic and steel pieces. Under one embodiment of Oberg, the plastic pieces are attached to the steel pieces using plastic stakes that extend from the plastic pieces through holes in the steel pieces. Heads are formed on the stakes by melting the plastic either using ultrasonic frequencies or heat. In a second embodiment, the steel is placed within a wall around the edge of the plastic and the wall is then melted over the edge of the steel. Oberg does not show or suggest applying the plastic material to the steel pieces using an adhesive.

Independent claim 1 is directed to a storage device with a suspension assembly that includes a metal material defining a portion of the suspension and a composite material having a higher stiffness to weight ratio than the metal material. The composite material is bonded directly to the metal material by an adhesive such that the same adhesive layer is bonded to both the composite material and the metal material.

Like claim 1, independent claims 13 and 21 include limitations to bonding a composite material directly to a portion of a suspension assembly using a single adhesive layer.

The combination of Pal and Oberg does not show or suggest the invention of claims 1, 13 or 21 because together these references do not suggest adhesively applying a composite material directly to a metal material on a suspension using a single layer of adhesive.

In Pal, the stiffening metal piece 36 is not applied directly to the load beam with a single layer of adhesive. Instead, Pal teaches that a thick viscoelastic material needs to be inserted between piece 36 and load beam 24 to absorb vibrational energy. Thus, Pal does not show or suggest applying any type of stiffening member to a load beam using a single layer of adhesive but instead only suggests applying a stiffening member to a damping material that is bonded to a load beam.

In the Final Office Action, it was asserted that the claims did not exclude Pal because they did not exclude the use of additional layers between a suspension layer and a stiffener layer. With the present amendments, independent claims 1, 13 and 21 have been amended to require that a metal suspension layer be bonded directly to a composite stiffener material using a single layer of adhesive. Thus, these claims now exclude the use of a thick viscoelastic material between a suspension and a composite stiffening material.

Like Pal, Oberg does not show or suggest adhesively applying a composite material directly to a metal material but instead shows that the composite material should be connected to the metal material using heat staking.

As shown by Oberg, the prior art did not consider bonding composite materials to a metal suspension using an adhesive. One reason for this was cost. Using an adhesive requires additional materials and additional processing steps

over Oberg. A second reason is that it was widely believed that it would be difficult to control the flow of the adhesive on the parts and that adhesive would seep through holes in the suspension and over the edges of the suspension. This would greatly complicate the manufacturing process because it would require further steps to remove the excess adhesive. Since suspensions are relatively delicate, any such additional processing is undesirable and costly.

However, the present inventors have found that counter to the general beliefs at the time, an adhesive could be controlled and would not flow outside of the boundaries of the suspension. This represents a new and inventive step over the prior art that was not recognized as being possible before the present invention.

Note that if adhesively applying a composite material to a metal material on a suspension was obvious, Oberg probably would have suggested it as one technique for connecting the two pieces. Instead, Oberg describes a technique that requires the melting of the composite material at selected points.

Since neither reference shows adhesively applying a stiffening member to a metal piece of a suspension, their combination does not show or suggest the invention of claims 1, 13 and 21 or claims 2, 6, 7, 15, 16, 23 and 24, which depend therefrom.

In light of the comments above, claims 1, 2, 6, 7, 13, 15, 16, 21, 23 and 24 are patentable over the combination of Pal and Oberg. Reconsideration and allowance of the claims is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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